Tactical Nutrition

Semper Fit
Health and Fitness

Fuel Clean. Run Better.

Clean / Nutrient-Dense Foods =
Faster Recovery &
Readiness For Next Workout

Improved Performance

- " . . . If someone wanted to focus on just one thing to improve their energy, which one would you recommend?"

- "The answer is simpler than you might think . . . Energy comes through consumption of food, and we have found that stabilizing blood sugar is probably the single most important thing we can do.

  Eating small meals, and eating often, actually has the most profound effect over time than almost anything that we see."

Excerpt from an interview with Jim Loehr,

Objectives

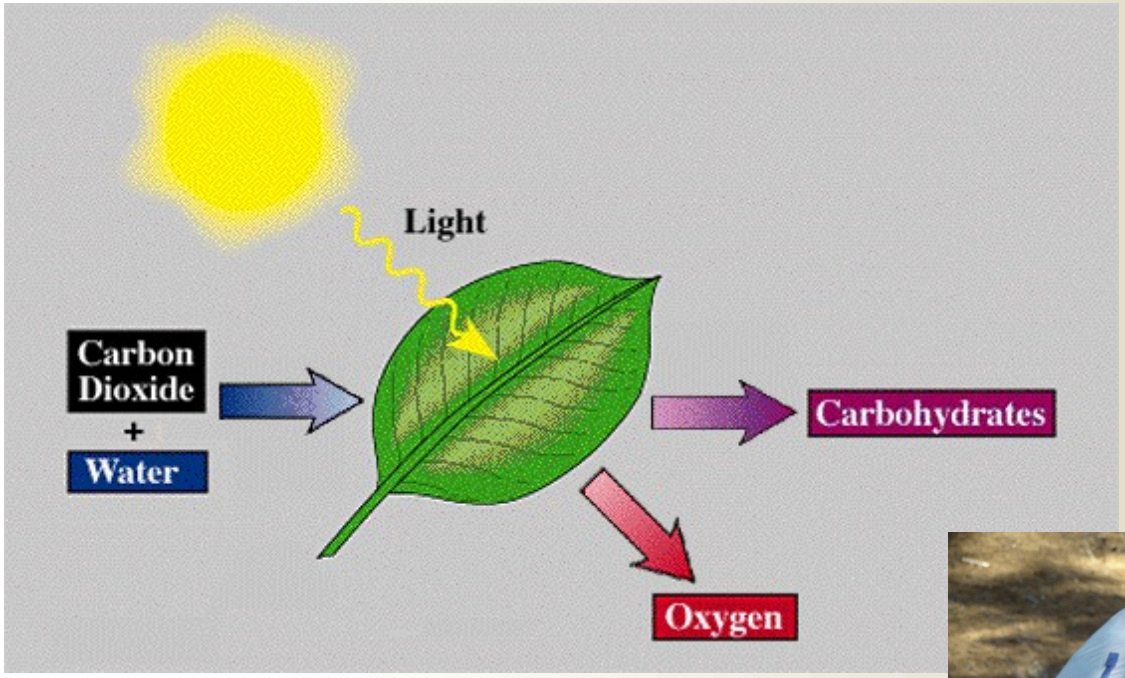
1) Fuel Sources
2) Choosemyplate.gov
3) Changing Body Composition
4) Alcohol & PT
5) Nutrient Timing
6) Hydration
7) Supplements

1) Fuel Sources

- Ultimate Energy Source = **Sun**

- Carbohydrates = Fast Burning Fuel

What is Energy?



How is Energy Converted?

- Humans convert food energy into:
  - Mechanical Energy = **Muscle** Activity
  - Electrical Energy = **Nerve** Conduction
  - Heat Energy = **Metabolism**

How is Energy Converted?

- **Glycemic Response**
  - **Measure of a food or drink's ability to raise blood sugar**
  - **Carbs = increase blood sugar**
  - **In response, pancreas release insulin**
    - **What if there is a large blood sugar spike?**
- **High glycemic response = rapid conversion of food into glucose**
- **Low glycemic response = slow conversion**

Forms of Energy

Active (Kinetic) =

- ATP in muscles for immediate use

Stored (Potential) =

- Body Fat & Glycogen in muscles & liver

Energy Measurements

- Energy is measured in units called kilocalories (kcal, “Cal” or “Calories”)
- A kilocalorie =

  Amount of energy needed to raise the temp of 1 kilogram of water by 1°C
- 1 kilocalorie = 1,000 calories or 1 Calorie (capital “C”)*

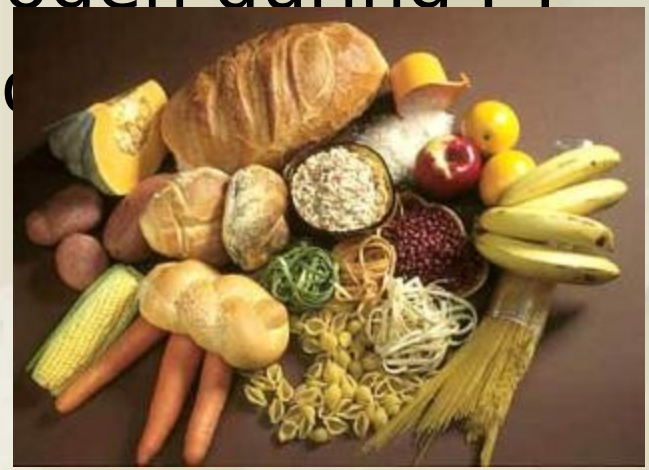
  *Nutrition labels often use “calories” to display kilocalories.

Energy Sources

- Food energy (Calories) → broken down by digestion, absorption & metabolism into usable forms of energy
- Food energy comes from:
  - Carbohydrates & Fats & Proteins
- The 2 primary fuel sources for PT are:
  - Carbohydrates
    - Broken down into glucose & stored as glycogen
  - Fats
    - Broken down into fatty acids & stored as triglycerides
- Repair source
  - Protein
    - Broken down in amino acids & cannot be stored

Carbohydrates

- **Job Description: QUICK BURNING FUEL**
  - Converted to glucose , a.k.a. blood sugar
  - Stored in liver & muscle as glycogen
  - Body uses glucose & glycogen during PT
  - Endurance & Brain Functi
  - 4 Calories per gram



Carbohydrate Classes

- **Complex:**
  - Starchy vegetables, beans, whole grains, whole fruits
  - Absorbed into the bloodstream slower, raise blood sugar slower & keep blood sugar even
- **Simple:**
  - Table sugar & natural sugars found in honey, fruit (fructose), and milk (lactose)
  - Lab-created sweeteners (high fructose corn syrup)
  - Absorbed into the bloodstream fast, easily digestible & raise blood sugar (glucose) fast

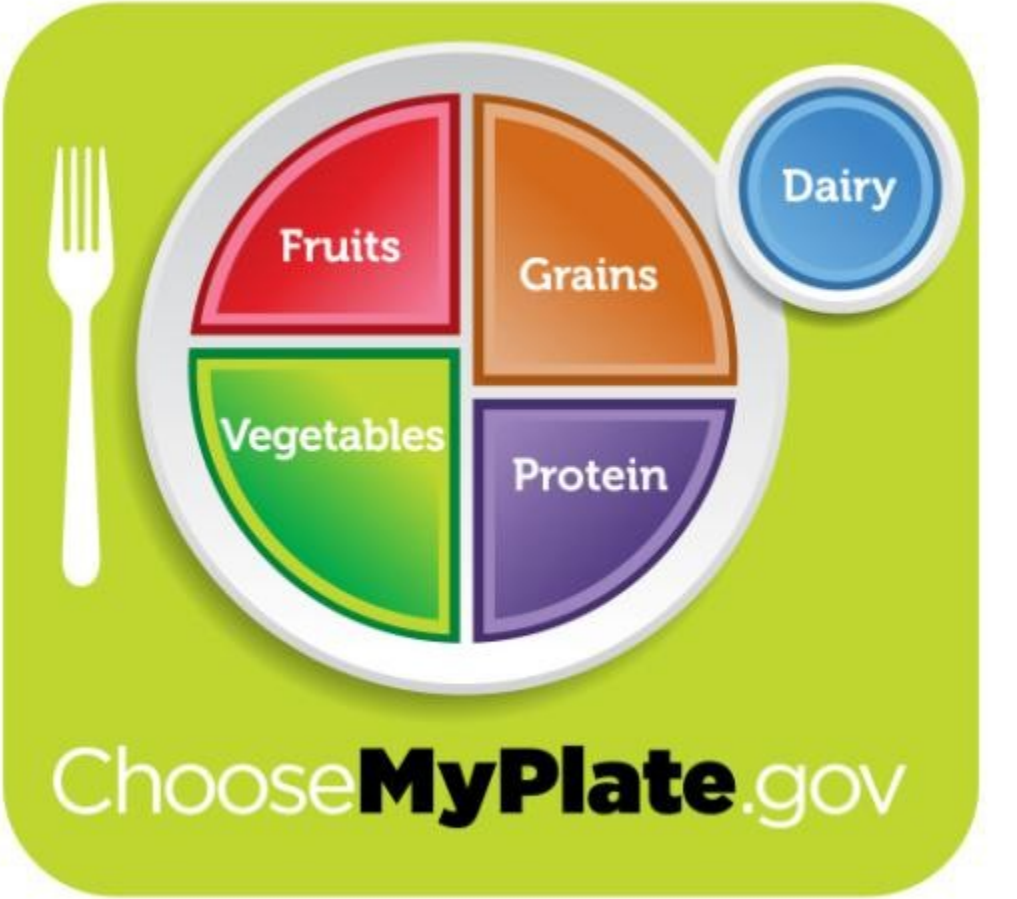
Fats

- **Job Description: SLOW BURNING FUEL**
  - Converted to fatty acids after eating
  - Cushion cells, support hormone levels (including testosterone & growth hormone) & nervous system
  - Deliver nutrients & vitamins to
  - Signal brain that we are “full”
  - 9 Calories per gram

Fat Classes

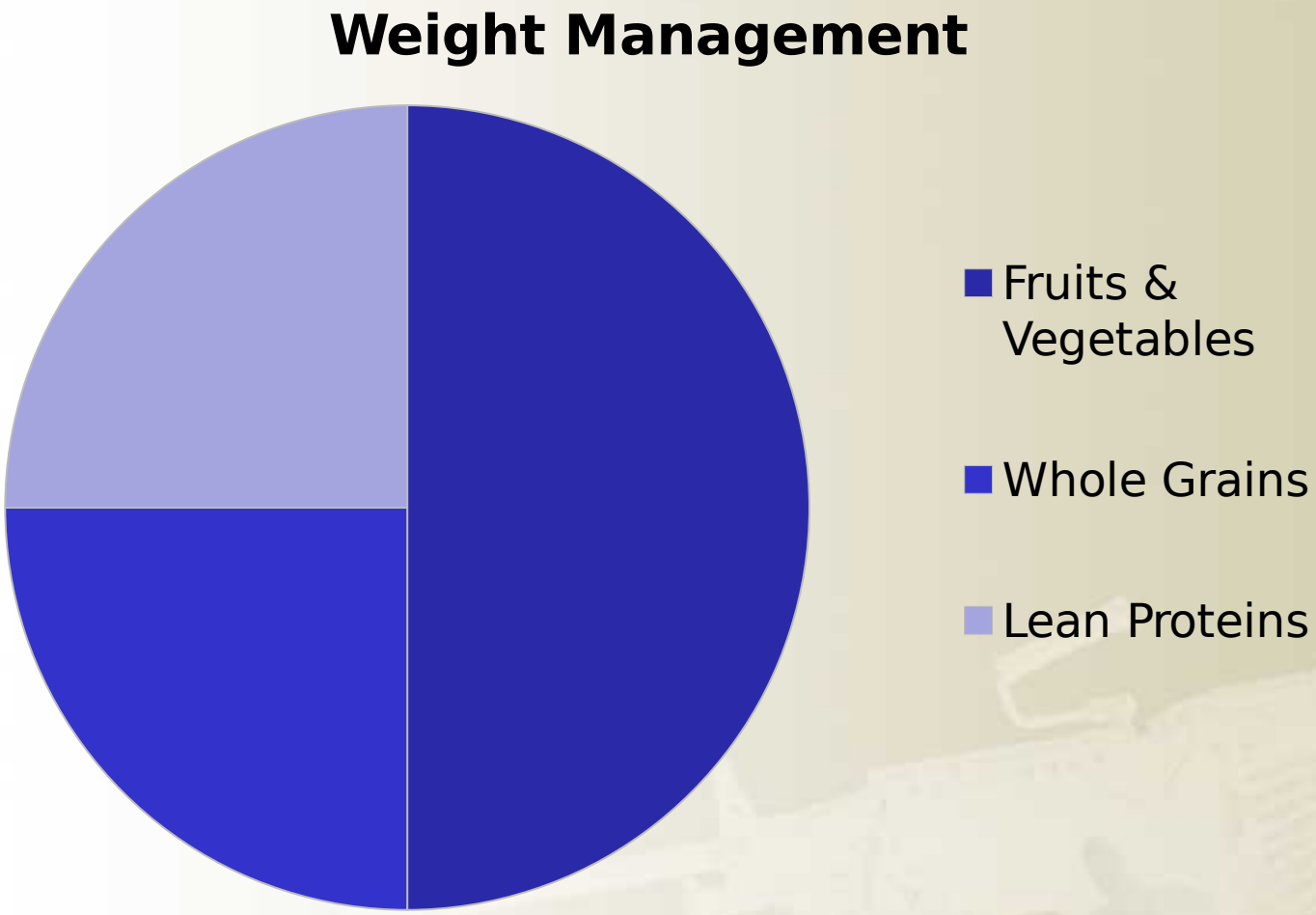
- **Unsaturated:**
  - Plant & Fish Sources (olives, corn, soybeans, nuts, avocados, sardines, salmon, trout)
- **Saturated:**
  - Meat, Poultry & Dairy Sources (beef, pork, chicken fat, ice cream, butter)
  - Tropical Oils (palm & coconut)
- **Trans or ‘Hydrogenated:’**
  - Lab Source (liquid oil is pumped with hydrogen to make it solid at room temp; lengthens shelf life of foods)

2) A Starting Place

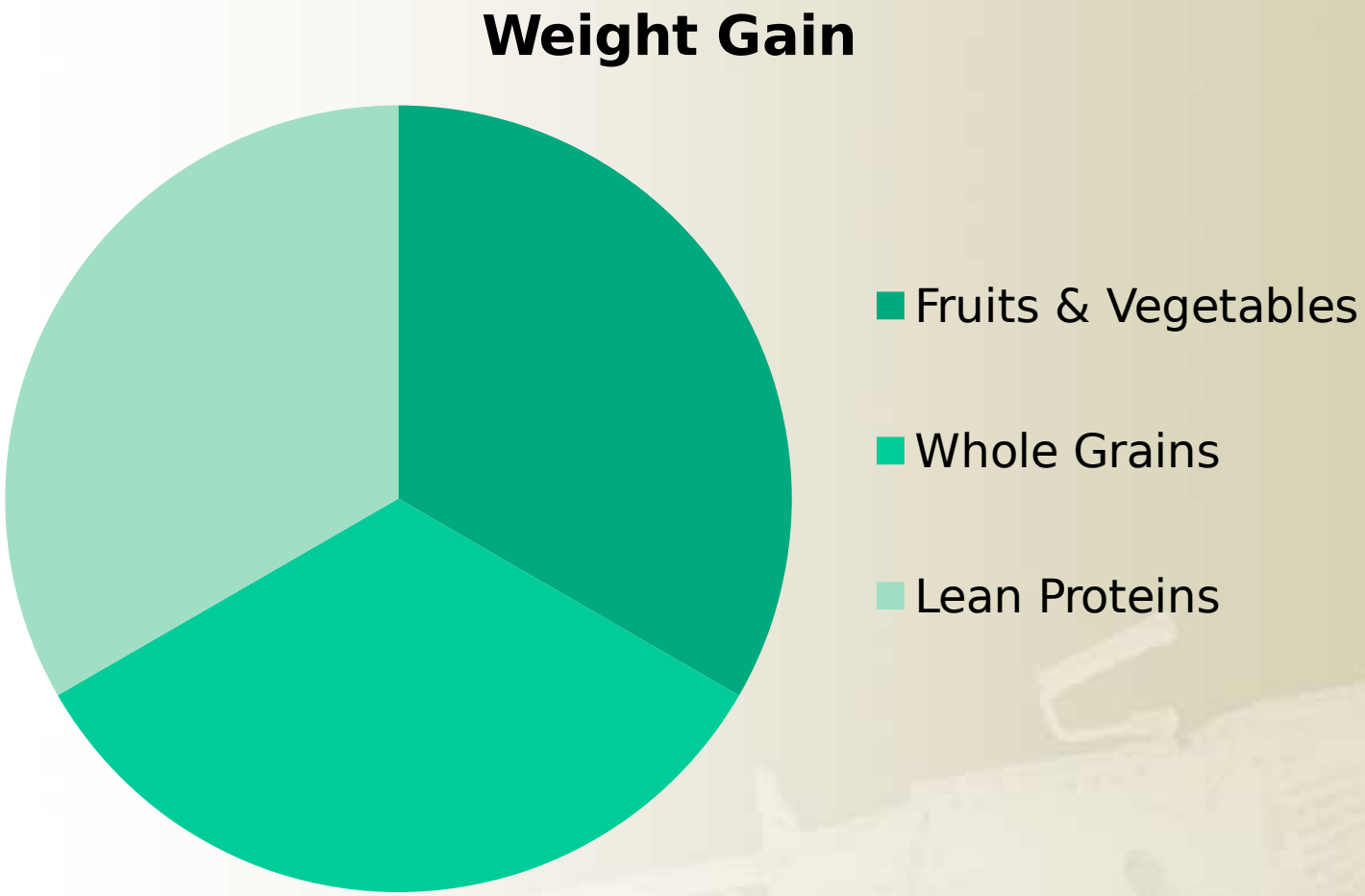


http://www.choosemyplate.gov

Variations


Weight Management
Fruits & Vegetables
Whole Grains
Lean Proteins

Variations



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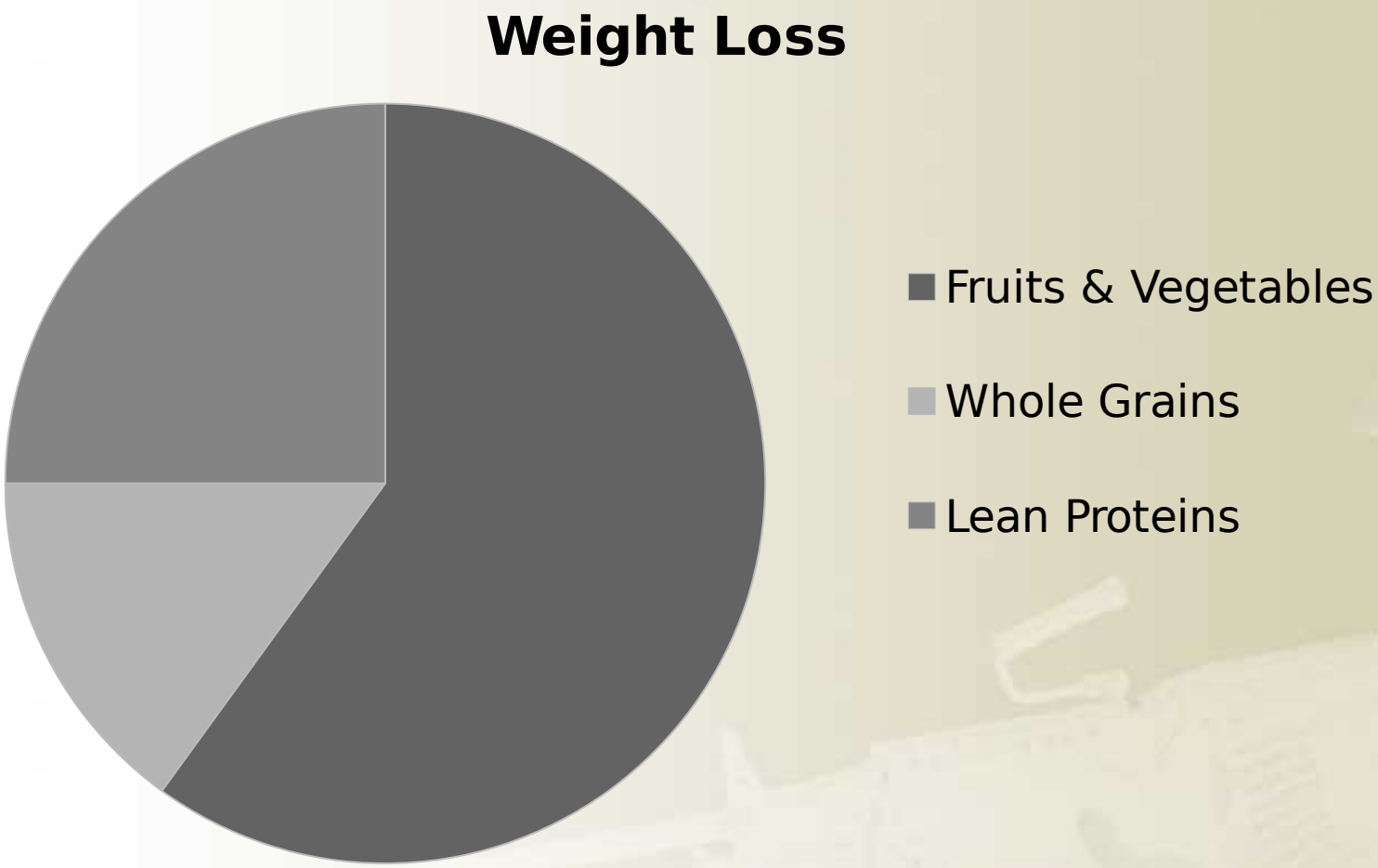


Fruits

- Fresh
  - Apples, Bananas, Oranges
- Frozen
  - Berries, Cherries
- Canned
  - Peaches, Fruit Cocktail
- Dried
  - Raisins, Figs
- Juices
  - Apple, Orange

Vegetables

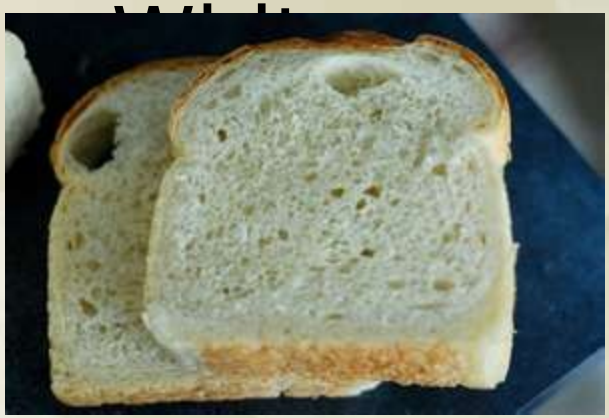
- Dark Green
  - Broccoli, Lettuce
- Red & Orange
  - Sweet potatoes, Carrots
- Starchy
  - White potatoes, Corn
- Beans & Peas
  - Black Beans, Split Peas
- Other
  - Celery, Onions

Grains: Whole

- “Whole” = Grain is still in its natural state
  - Fiber, Vitamins & Minerals are in the outer parts of the grains
  - The fiber on these helps keep you feeling fuller longer than refined grains
    - Soluble & Insoluble
  - Whole Wheat, Brown Rice, Oats, Whole

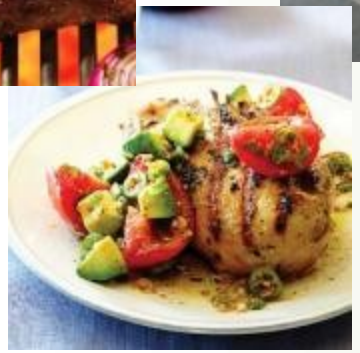
Grains: Refined

- “Refined” = Outer parts of the grain removed for texture & longer shelf-life
  - Many are “enriched” = vitamins & minerals added in after processing, but they often lack fiber
  - White Flour, White Rice, White



Lean Proteins

- **Job Description: REPAIR & BUILD**
  - Converted to amino acids (building blocks)
  - Repair tissue after PT
  - 4 Calories per gram



Proteins: Complete

- Complete (Animal Sources)
- Have all 20 building blocks: “amino acids”
  - Meats
  - Poultry
  - Seafood
  - Eggs

Proteins: Incomplete

- Incomplete (Plant Sources)
  - Don’t have all 20 essential amino acids
    - Beans
    - Nuts
    - Soy Products (Tofu)

  - bining Incompletes Makes a plete
    - Beans & [Brown] Rice
    - Peanut Butter & [Wheat] Bread

Proteins: Dairy

- Milk
- Cheese
- Yogurt
- *Calcium-Fortified Soymilk

How much Protein do you need?

- RDA for Protein = .8 - 2
  - Athletes can range from .8 – 2 grams/kg BW
- Calculate Your Requirement:
  - Take your weight in pounds ÷ 2.2 = wt in kg
  - Weight in kg x .8 = protein requirement
    - 165lbs ÷ 2.2 = 75 x .8 = 60 grams of protein
    - 165lbs ÷ 2.2 = 75 x 2 = 150 grams of protein

Too much Protein?

- Excess amino acids are not stored as muscle tissue; they are converted to nitrogen and lost through urine
- Muscle strength, size and shape comes from exercise, not from extra protein
- Too much protein can result in nutrient imbalance, kidney strain, and dehydration
- Just enough* can help you feel full all day

  (*July ‘11 Study: 18 – 35% of total Calories)
- Goal: Include a small amount at each meal

*Fiber Note

- For males ages 19 - 50,

Recommended daily amount is 38 grams

2 medium-sized apples +
1 banana +
2 cups of broccoli +
2 cups of raw carrots +
1 cup of celery +
1 cup of squash +
3 ounces of almonds =

38 grams of fiber

3) Changing Body Comp

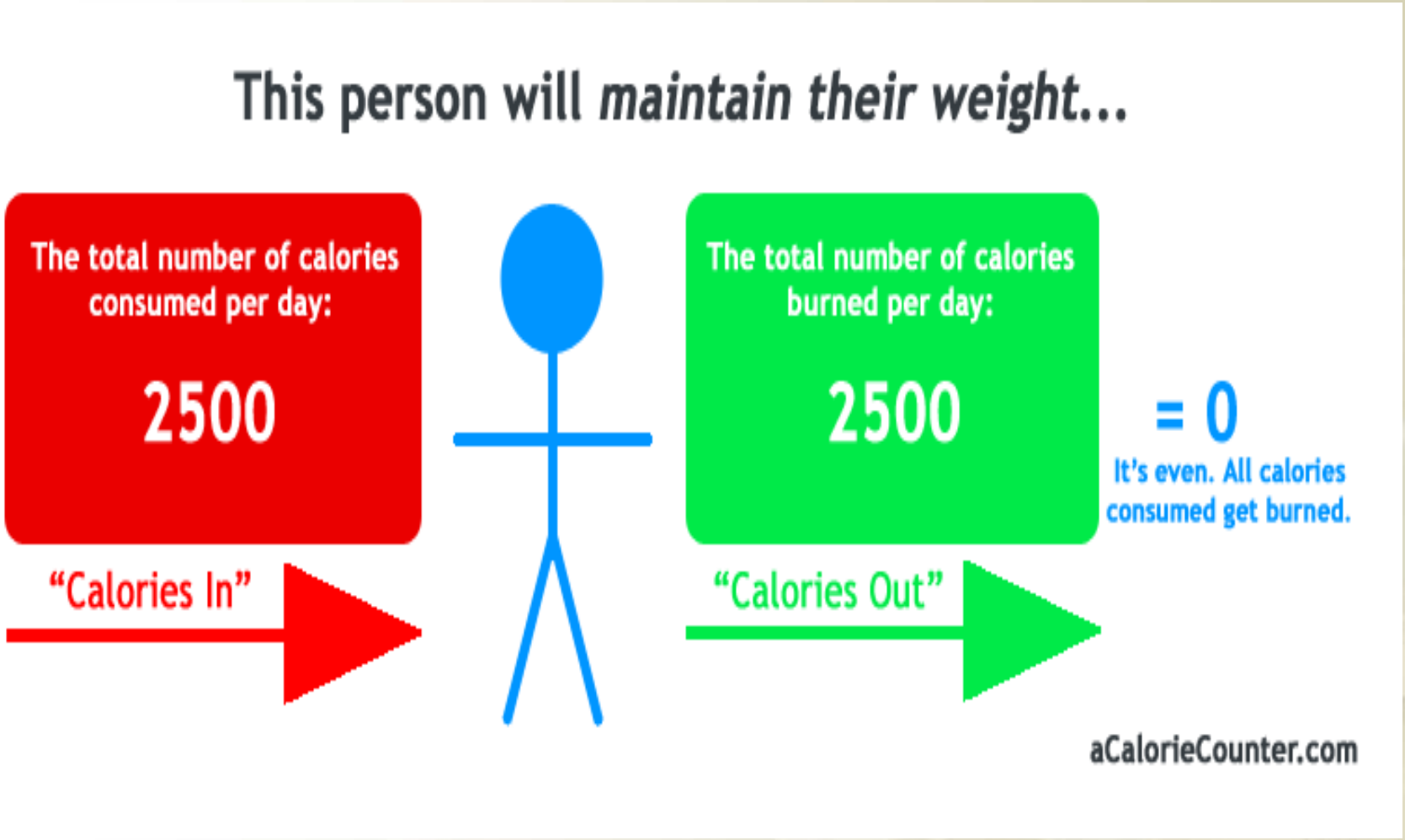
- Metabolic Math
- Under the Radar Calories
- One Meal: Two Options
- Portion Distortion
- Reading Labels
- Signs of a Fad Diet
- First Steps

Metabolic Math

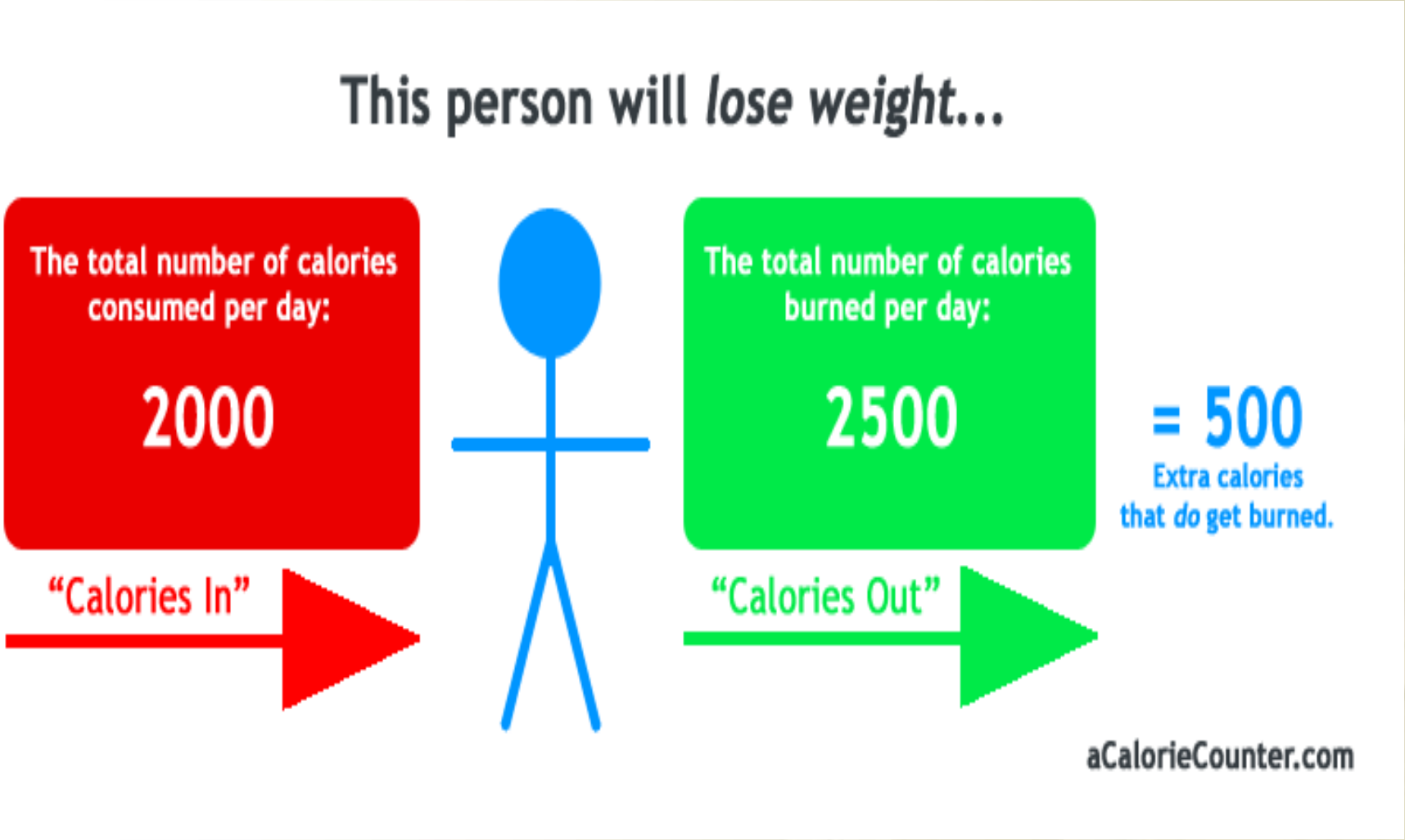
- Men generally = 1500 min
- Women generally = 1200 min
- Minimum calories
  - Your weight + “0” at the end
  - 180lb + 0 = 1800 minimum calories

Metabolic Math

Metabolic Math



Metabolic Math



Metabolic Math

- 180 lbs = at least 1800 calories
- Actual consumption = 2000
- Expenditure = 2500
- Deficit = 500
- 500 x 7 = -3500
- -3500 = 1 lb
    - Recommended 1-2 lb/week

Under the Radar Calories

Coffee
with creamer
8 oz.
30 calories

McDonald's
Small Sprite
16 oz.
150 calories

Starbucks
Venti Cappuccino
20 oz.
200 calories

Burger King
Large Coca-Cola
32 oz.
310 calories

7-Eleven
Double Gulp Coca-Cola
64 oz.
600 calories

One Meal: Two Options

Item	**Calories**
Big Mac	540
Large Fries	570
Large Coke	310
Total:	***1420 Kcals 63 grams Fat***

Item	**Calories**
Hamburger	270
Fruit and Walnut Salad	210
1% Low Fat Milk	100
Total:	***580 Kcals 22 grams Fat***

Portion Distortion

- A bagel 20 years ago was 3 inches in diameter and had **<u>140 calories</u>**. How many calories do you think are in today's bagel??

Today’s bagel has 350 calories!!!

210 Extra Calories

Portion Distortion

- A portion of spaghetti and meatballs 20 years ago had **500 calories**. How many calories do you think are in today's portion of spaghetti and meatballs?

Today’s Spaghetti & Meatballs

1,025 Calories! = 525 Extra Calories

How to read a food label

- ***Step 1: Serving Size***
  - How many servings are in the container?
- ***Step 2: Check Calories***
- ***Step 3: Check Fat / Cholesterol / Salt***
- ***Step 4: Review Fiber / Sugar Ratio:***
  - Fiber: @ Least 25 grams / day
  - Sugar: <50grams / day
- ***Step 5: Get Enough of these Nutrients***

Nutrition Facts

Serving Size ½ cup (114g)
Servings Per Container 4

Amount Per Serving

Calories 90	Calories from Fat 30
	% Daily Value*
Total Fat 3g	**5%**
Saturated Fat 0g	**0%**
Cholesterol 0mg	**0%**
Sodium 300mg	**13%**
Total Carbohydrate 13g	**4%**
Dietary Fiber 3g	**12%**
Sugars 3g	
Protein 3g	

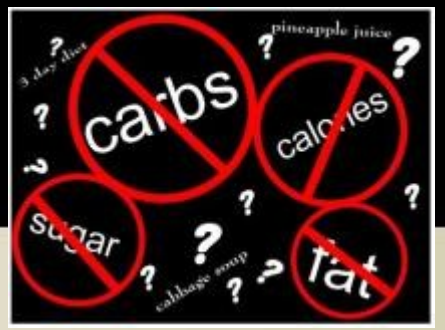
Vitamin A 80% • Vitamin C 60%
Calcium 4% • Iron 4%

* Percent Daily Values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs:

	Calories:	2,000	2,500
Total Fat	Less than	65g	80g
Sat Fat	Less than	20g	25g
Cholesterol	Less than	300mg	300mg
Sodium	Less than	2,400mg	2,400mg
Total Carbohydrate		300g	375g
Dietary Fiber		25g	30g

Calories per gram:
Fat 9 • Carbohydrate 4 • Protein 4

Signs of a Fad Diet



- Rapid Weight Loss (more than 2 lbs per week)
- No Need to Exercise
- Not Sustainable over the Long Haul
- Specific Foods or Entire Food Groups Not Allowed
- Marketing Based on Personal or Celebrity Testimonials or on Scare Tactics
- Sounds Too Good to Be True
- The Info Source is Trying to Sell a Product

First Steps

- High Fiber & High Water Content Foods
- Lower Sugar Intake
- Combine Carbs / Fiber, Fat & Protein @ Each Meal
- Start Dinner with a Plate of Vegetables
- Eat on a Regular Schedule

Stable Weight Foods

In a study of 120,877 U.S. men & women over a 20 year period, these foods were associated with *long term stable weights*:

- Yogurt
- Nuts
- Fruits
- Whole Grains
- Vegetables

4) Alcohol & PT

- Alcohol affects:
  - Balance and steadiness
  - Reaction time
  - Fine and complex motor skills
  - Information processing
  - B Vitamin Absorption

- " . . . athletes who socially consume excessive alcohol the evening after a practice or a game may subsequently have an impairment of athletic skills for as long as 14 hours." *(Source: ESPN)*

Alcohol Calories

Calorie & Carb Comparison

Beverage	***Serving Size***	***Calories Per Serving***	***Carbs Per Serving (g)***
Beer (Regular)	12 oz	145 – 150	10 – 14
Beer (Light)	12 oz	100 – 110	5 – 7
Wine (Red)	5 oz	100 – 125	4 – 5
Wine (White)	5 oz	100 – 125	<1 – 2
Distilled Spirits (80-proof)	1.5 oz	100	0

One 12 oz beer has 103 calories. Did you ever wonder how many calories are in 6 beers?

=

618 Calories !

One Rum & Coke has 240 Calories, Did you ever wonder how many calories were in 6 Rum & Cokes?

6 Rum & Cokes have

1,440 Calories !

Alcohol & Blood Sugar

- Maintaining even blood sugar level is key to nutritional fitness
- Alcohol causes blood sugar to rise fast and then crash down
- Most alcoholics have blood sugar issues

Alcohol: Research Studies

- A 2006 study of 8 men showed that drinking artificially sweetened drinks vice sugar sweetened drinks with alcohol raised BAC more (0.05% vice 0.03% respectively).

- Mixing caffeine & alcohol could increase dopamine levels, which makes the combo more enjoyable & more addicting.

- Alcohol interferes with the body’s ability to absorb certain vitamins, including B12, which helps the body process protein & aids with the development of red blood cells. Deficiency symptoms can include memory problems, nerve problems & depression.

Recommended Maxes

- Men = 2 drinks max per day
- Women = 1 drink max per day

- 1 Drink Defined =
  - 12 oz of beer
  - 8 oz of malt liquor
  - 4 - 6 oz of wine
  - 1 ½ oz of distilled spirits / hard liquor (gin, vodka, whiskey, rum)

SHORT RECESS

5) Nutrient Timing

- Eat to train
- Factors
  - Before, During & After training
  - Volume and intensity of training
  - Time between sessions

General Recommendations

- Aim for carbs and protein at every meal
  - Carbs and fat are primary fuel sources; protein is a repair source
  - Limit fat/fiber before training
- Eat 5-6 small meals/day
- Fruit or vegetable at every meal
- Do not overly restrict your calories
  - Your body weight (*e.g.* 150lb) + “0” at the end = minimum 1500 calories/day (estimate)
- Eat breakfast!
  - Oatmeal with berries, nuts and low-fat milk
  - Toaster waffle with low-fat yogurt and berries
  - Eggs, whole wheat toast and orange juice
  - Breakfast burrito (whole wheat tortilla, 2 eggs, low-fat cheese, veggies, salsa, beans)

Nutrient Timing Timeline

- Before training
- During training
- After training

Nutrient Timing Timeline

- Before training
  - Practice your pre-event meal and snack during training
  - Right before competition, do *NOT*:
    - Try new foods
    - Eat foods that cause GI stress
      - beans
      - Fatty foods (greasy hamburger and fries)
      - Cabbage, broccoli, cauliflower
      - Popcorn
      - High sugar foods, drinks or candy

Before Training

- > 2 hours before training
- 1-2 hours before training
- < 1 hour before training

Before training

- > 2 hours before training
  - Turkey and Swiss cheese sandwich with fruit
  - Whole wheat bagel, low-fat cream cheese & banana
  - Pasta with tomato based sauce
  - Baked potato and low-fat filling
  - Fruit smoothie, ***not*** protein smoothie!
    - Low-fat milk, fruit, low-fat yogurt

Before training

- 1-2 hours before training
  - Fresh fruits
  - Yogurt
  - Whole wheat bread and pasta
  - Baked chicken with rice pilaf and veggies

Before training

- < 1 hour before training
  - Apples, watermelon, peaches, grapes and oranges
  - Bowl of cereal and low-fat milk
  - 100% fruit juice
  - 6oz low-fat chocolate milk

Before training

- Carb Loading
  - Glycogen depletion is a major cause of fatigue during long duration exercises (greater than 60-90 mins)
  - Goal is to increase muscle and liver glycogen stores prior to event
  - Increasing carbs and tapering training in the 3 days leading up to the event can DOUBLE the amount of stored glycogen
    - on average, a person has about 1600-1800 calories from carbs stored at any given time
    - Doubling this = 3600 calories

Carb Loading Studies

- Endurance Athletes need more Carbohydrates than Strength Athletes

(about 60% daily Calories)

- Cyclists who ate a carb-rich diet doubled their endurance capacity
- Cyclists who ate primarily fat & protein reduced endurance to almost ½ normal capacity

Carb Loading Studies

- Carbs v. Proteins
  - In a study of 3 groups of runners . . .
    - 1 added ‘simple’ carbs to their diets
    - 1 added ‘complex’ carbs
    - 1 added protein
  - The 2 Carb groups’ running times improved:
    - Simple Carb Group: 23% Improvement
  - Complex Carb Group: 26% Improvement
  - No improvement in the protein group

During training

- Training lasting < 45 mins
  - not necessary or practical
- High intensity exercise, 45-75 mins
  - Small amounts of sports drink/food
- Endurance & intermittent high intensity, 1-1.5 hours
  - 30 to 60g/hr
- Endurance, 2.5 hours and beyond
  - Up to 80-90g/hour

During training

- High glycemic response
- Usually carbohydrate alone
  - If prolonged endurance, add amino acids
    - Glutamine
    - Branched Chain Amino Acids

During training

- Sports drinks
  - For exercise lasting longer than 1 hour
  - Do *NOT* dilute sports drinks with water
  - Look for:
    - 20 to 50 milligrams of potassium per 8 ounces
    - 12 to 24 grams of carbohydrate per 8 ounces
    - 110 to 170 milligrams of sodium per 8 ounces

During training

8 oz =

30 mg potassium
14 g carbs
110 mg sodium

12 oz bottle =

48.8 mg potassium
.1g carbs
81 mg sodium

20 oz =

175 g potassium
4 g carbs
0 g sodium

After training

- “Recovery window”
  - Help prevent additional protein breakdown
  - Attenuate the cortisol response
- Carbs and protein
  - Activate different but cooperative signaling pathways
  - 1.2-1.5g carb/kg & .4-.6g protein/kg
- 2 hours post
  - Continue consuming foods with low to moderate glycemic response
  - 1.2-1.5g carb/kg & .4-.6g protein/kg

After training

- Cycling Study
  - Carb and protein consumed immediately or 3 hours after moderate cycling training
  - Immediately after
    - Whole body protein synthesis was increased by 300%
  - 3 hours post
    - Whole body protein synthesis was increased by 12%

After training

- Examples
  - 8-16oz chocolate milk
  - Peanut butter and banana sandwich, glass of low-fat milk
  - Greek yogurt and fresh fruit
  - Tuna in water with Triscuits, provolone cheese and fruit
  - Microwave burrito (Evol, Amy’s) and fruit
  - Chicken strips (Perdue Shortcuts), microwave brown rice, frozen veggies and fruit

After training

- Chocolate Milk:

  “After riding a bike for 90 minutes at moderate intensity, then for 10 minutes of high intensity intervals, 10 trained cyclists had significantly more power and rode faster (reduced their ride time by an average of six minutes) when they consumed low-fat chocolate milk rather than a carbohydrate sports drink or calorie-free beverage.”

  Source: : http://www.utexas.edu/news/2011/06/22/milk_studies/

- Smoothies
  - Fruit (bananas, berries)
  - Milk, Yogurt
  - Avocados
  - Olive Oil
  - Nuts / Nut Butters (peanut butter, walnuts)

Real Recovery

- Antioxidants & Oxygen Turnover:
  - Free Radicals (Offense)
  - Antioxidants (Defense)

- Because athletes turn over more oxygen than non-athletes, sports nutritionists recommend that they eat 3 times more antioxidants than non-athletes

Real Recovery

- Raw Honey
  - B Vitamins, Calcium, Magnesium
  - Promotes Even Blood Sugar
  - Anti-Bacterial / Anti-Fungal / Anti-Viral*
    - » *Heating eliminates these benefits
- Watermelon
  - High in Water and Natural Sugar
  - Vitamins C, A & B (Energy), Potassium
  - 1 Cup = 48 Calories

Real Recovery

- Avocados
- Walnuts / Almonds
- Flaxseeds
- Dark Chocolate

Real Recovery

- Berries (Cherries, Blueberries, Raspberries, etc)
- Melons (Watermelon, Cantaloupe, etc)
- Carrots
- Red Peppers
- Oranges

Real Recovery

- Milk
  - 80% Casein (Slow Protein)
  - 20% Whey (Fast Protein)
  - Natural Branched Chain Amino Acids
  - Calcium, Vitamin D, B Vitamins, Tryptophan
- Eggs
  - Amino Acids
  - *Bonus*: Eggs contain cysteine, a substance that helps the liver break down alcohol

Real Recovery

- Salmon
- Sardines
- Tuna

6) Hydration

- Necessary for maximum performance
- Plays a critical role in regulating body temperature
- Carries nutrients throughout the body
- Improves digestion
- Eliminates waste and toxins from the body

Hydration Symptoms of Dehydration

- Moderate
  - Thirsty
  - Headache
  - Dry mouth
  - Dry skin
  - Fatigue
  - Dizzy
- Severe
  - Chills
  - Increased heart rate
  - Muscle cramps
  - Nausea/vomiting
  - Swollen stomach
  - Confusion

Hydration

I am/you are well hydrated
I am/you are not hydrated enough
I am/you are dehydrated
1
2
3
4
5
6
7
8

Hydration

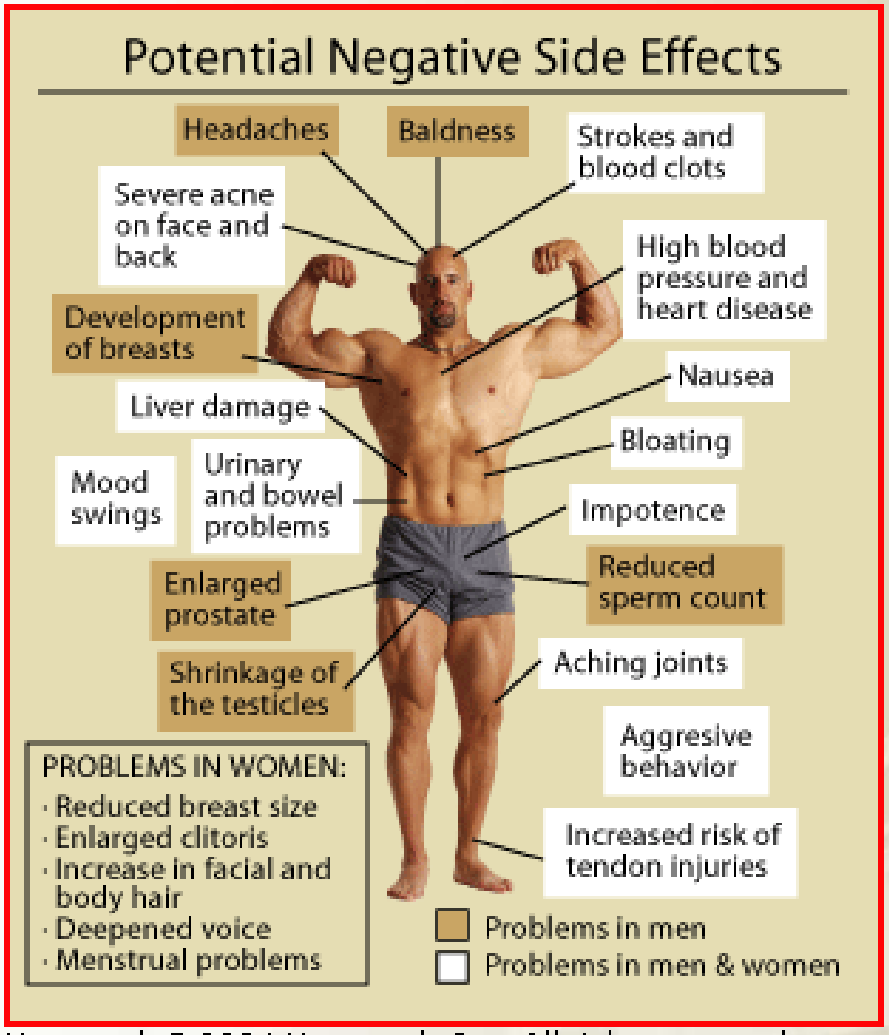
- Loss of 2% body weight
  - Increased perceived effort
  - Reduced performance by 10 to 20%
  - 2% = 3lbs for 150lb athlete
- Loss of 3-5% body weight impairs
  - Reaction time
  - Judgment
  - Concentration
  - Decision making ability
  - Body temperature regulation
  - Brain function

Hydration

- Daily water requirement
  - Body weight in pounds divided by 2 = ounces per day (does not include exercise)
  - 150lb divided by 2 = 75 ounces water/day
  - Half gallon = 64 ounces
- With exercise add:
  - 16 ounces 2 hours prior to training
  - 4-8 ounces 10 minutes prior (1 large gulp = 1 ounce)
  - 4-8 ounces every 20 minutes during
  - 24 ounces for every pound lost during exercise

7) Supplements

- What is a dietary supplement?
- Dietary Supplement and Health Education Act
- Guidelines for evaluating dietary supplements



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What is a dietary supplement?

- A dietary supplement is a product that contains one or more dietary ingredients intended to supplement the diet
  - Macronutrients
  - Vitamins, minerals, amino acids
  - Herbs or other botanicals
  - “other”

Branched-Chain Amino Acids: Supplements v. Real Food

Protein Source	Isoleucine (G)	Leucine (g)	Valine (g)
Met Rx Whey (1 scoop)	1.4	2.3	1.3
2 amino acid supplements	1.0	1.4	.8
Chocolate Milk (16oz)	1.2	1.9	1.1
Cottage Cheese (1 cup)	1.7	3.0	1.7
Tuna (6oz)	2.0	3.5	4.5
Chicken/Turkey (6oz)	2.0	3.5	2.5
Lentils (1 Cup)	1.3	1.7	1.2

Branched-Chain Amino Acids: Supplements v. Real Food Costs

	Protein g / serving	$ / serving
Egg Whites, 2	7	$.21
Powdered milk, 1/4c	8	$.21
Meat, deli, 4 oz	32	$1.25
Tuna, 6oz	40	$1.00
Protein Bar	23	$2.29
MetRx, 1 pkt	38	$2.70

Dietary Supplement and Health Education Act

- Signed into law October 2004
- Manufacturers can claim *anything* except:
  - Product prevents, cures and/or treats disease unless there is overwhelming scientific evidence to support that claim
- Subject to *limited* pre-market review & *no* pre-market approval
  - No formulation standards
  - No product registration
  - Manufacturer is responsible for ensuring safety and compliance

Evaluating a dietary supplement

- Does it make unrealistic promises?
- Does it have a “secret” ingredient or proprietary blend?
- Is it promoted by a celebrity?
- Do you know what the ingredients are?
- How was the product tested?
- What’s the cost compared to a food equivalent?
- Does it sound to good to be true?

DIETARY SUPPLEMENT
USP
VERIFIED

APPROVED
QUALITY
CL
ConsumerLab.com

Supplement Info & Resources

- Warfighters' Database:
  - http://humanperformanceresourcecenter.org/
- FDA Product Recall Site:
  - www.fda.gov/Safety/Recalls/default.htm
- United States Pharmacopeia Site:
  - www.usp.org
- NSF Sport:
  - http://www.nsfsport.com/
- NSF International:
  - http://www.nsf.org/certified/consumer/listings_main.asp

Summary

- Eat Clean
- Fresh is Best
- Understand Metabolic Math
- Monitor Alcohol Consumption
- Eat to Train
- Maintain Hydration
- Be Careful with Supplements
- Individualize the Info

QUESTIONS?

Points of Contact

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http://www.marines.mil/unit/marforres/MFRHQ/MCCS/SemperFit/Health.aspx

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